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Glossary of Terms Used in Agrotextile

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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Technical Textiles for Agro-tech Sectional Committee had been approved by the Textile Division Council.

The history of textiles reveals that specialized trades, users and industry required particular types of fabric, often contributing to the manufacture other products, like agrotextiles, such as shade nets, fishing nets, ground covers, mulch mats, crop covers, etc. Trade names or chemical names have been given to specialized fibres and fabrics and are now often used in addition to or instead of traditional terms. The consumer is now fully informed of the fibre content of a cloth and words like as polyester or polypropylene or polyethylene appear regularly on labels. In recent years, the use of plastic materials in agricultural and horticultural applications has increased and the basic terms related to these materials need to be understood properly. The design and development of new fabrics has also, provided consumers with new words.

The worldwide textile industry is second only in size to agriculture and over the centuries has developed a vast array of regional and international technology and terminology. The origin of many terms in the textile industry are obscure and often, to the layman, quite mystifying. The terms used in agrotextiles can be interpreted by different persons, organizations and end users, etc. in different way and thus can lead to confusion and dispute in general and legal terms. As such these terms have to be defined to have a common meaning for all concerned so as to avoid misinterpretation and confusion.

This glossary of textile terms used in agrotech applications is expected to be useful to people who design, produce and sell agrotextiles and for those buyers and policy makers who use and regulate such textiles. It sets out to avoid too much technical jargon and will help students, producers, retailers and consumers alike and stimulate their interest in agrotextiles.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GLOSSARY OF TERMS USED IN AGROTEXTILE

1 SCOPE

This standard prescribes definitions of terms commonly used for agro-textiles.

2 DEFINITIONS

For the purpose of this standard the following terms shall apply.

2.1 General Terms

2.1.1 *Agriculture* — It is science, art, or practice of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation and marketing of the resulting products.

2.1.2 *Agricultural Belting* — A conveyor belt usually made of rugged PVC, consists of two end pulleys, with a continuous loop of material that rotates about them. The pulleys are powered, moving the belt and the product on the belt forward. Conveyor belts are extensively used to transport agricultural materials, such as grain, fodder and various farm equipment.

NOTE — With a narrow window of opportunity when the crop must be harvested, timing is vital in agriculture. As the crops are taken up from the fields and moved through various processing stages, belting plays a key role.

2.1.3 *Agro-net House* — Agro-net house is a framed structure covered by shade nets of different shade factors or any other woven material to allow required sunlight, moisture and air to pass through the gaps. It creates an appropriate micro-climate conductive to the plant growth. It is also referred as shade house or net house

2.1.4 *Agro-textiles* — Any textile material used in agriculture, horticulture, forestry, animal husbandry and aquaculture such as fabrics (woven, non-woven or knitted), nets, crop covers, mulch, mats, ropes, etc.

2.1.5 *Air Laid Non-woven* — An air laid web that has been bonded (*see* **2.1.7**) by one or more techniques to provide fabric integrity.

2.1.6 *Anti-insect Fabric* — It is a closely woven UV stabilized monofilament polypropylene biomesh used for a variety of applications. It has a strand density of 32 strands per square inch. This provides an average opening between the strands of only half a millimetre. Sheets of biomesh may be used outdoors over a simple framework to effectively guard against pest as small as 0.5 mm. It can also be used in horticultural and agricultural structures covering ventilation openings to block out insects.

2.1.7 *Bonding* — The process of combining fibres in webs into sheets by means of self adherence, solvent-based adhesives, thermally softened plastics, or by mechanical entanglement.

NOTES

1 Bonding is a critical step in the production of non-wovens, and the choice of the method and the material used is at least as important to ultimate functional properties as the basic fibres in the web. The bonding may be all over or restricted to predetermined, discrete sites.

2 Bonding can be done in many ways:

a) *Binder fibres* — Specially engineered low melting point fibres are blended with other fibres in a web, so that a uniformly bonded structure can be generated at low temperature by fusion of the binder fibre with adjacent fibres.

b) *Point bonding* — The process of binding thermoplastic fibres into a non-woven fabric by applying heat and pressure so that a discrete pattern of fibre bonds is formed. This is also called spot bonding.

c) *Print bonding* — The process of binding fibres into a non-woven fabric by applying an adhesive in a discrete pattern.

d) *Saturation bonding* — A web bonding technique that saturates a web with an adhesive binder followed by drying and curing.

e) *Spray bonding* — The process of binding fibres into a non-woven fabric involving the spray application of a binder.

f) *Stitch bonding* — A bonding technique for non-wovens in which the fibres are connected by stitches sewn or knitted through the web. This is also known as quilting.

2.1.8 *Calender Bonding* — Thermally bonding a web of loose fibres by passing them through the nip of a pair of calender rollers, of which one or both are heated. Plain or patterned rollers may be used (*see* Point Bonding).

2.1.9 *Cross Laid Non-woven* — A cross laid web that has been bonded by one or more techniques to provide fabric integrity.

2.1.10 *Dry Laid Non-woven* — The dry laid web of fibres that has been bonded by one or more bonding techniques to produce a fabric with integrity.

2.1.11 *Flexible Silos* — Flexible textile silos, made of active-breathing, dust-tight, very strong and durable polyester fabric, guarantee constant grain quality and healthy livestock. Contrary to solid silos, flexible silos will also limit condensation, which means that the formation of mould is effectively prevented. Finally, the galvanized steel frame and the jacket and roof cover made of PVC coated polyester fabric, insure the silos are weather-resistant.

2.1.12 *Flexible Tanks* — Flexible tanks are ideal for storing and transporting liquids (drinking water, hydrocarbons, chemical solutions, foodstuffs, industrial or agricultural waste, sludge, etc) and are manufactured using elastomer or plastomer materials, depending on the application, and reinforced with a high strength fabric insert (usually PVC). These are a simple and economic solution for several farming applications, thus replacing costly stainless steel tanks, and expensive glass or lead linings.

2.1.13 *Frost Cover Fabrics* — Used primarily by professional growers for the protection of plants and golf course greens and tee boxes, frost cover fabrics help protect vegetation in winter time, or from sudden drops in temperature during unseasonable weather, which can cause extensive damage to landscaping and crops.

2.1.14 *Geo-membrane* — Geo-membranes are very low permeability synthetic liners used to control fluid or gas migration within soil, rock, earth or any other geo-technical material, as integral part of a man-made product, structure or system.

2.1.15 *Greenhouse* — A framed or inflated structure covered with transparent or translucent materials and large enough to walk in and grow crops under partial or fully controlled environmental conditions.

NOTES

1 The climatic conditions normally controlled are light, temperature, carbon dioxide level, relative humidity etc.

2 UV stabilized cladding material mostly used in greenhouse are polyethylene film, glass, multi wall sheet of poly carbonate, poly methyl mac acrylate acrylic glass etc.

3 Structural frames of greenhouse are generally made of GI pipe or MS angle, or wood or bamboo.

2.1.16 *HDPE Vermibed* — HDPE Vermibed is a portable vermibed used in producing organic compost for organic farming. Vermicompost is made from farm waste and cowdung using earthworms.

2.1.17 *Horticulture* — The science or art of cultivating fruits, vegetables, flowers, or ornamental plants, medicinal plants and their processing and preservation. Etymologically, horticulture can be broken down into two Latin words: *hortus* (garden) and *colere* (cultivate).

2.1.18 *Knitting* — A method of producing a fabric by interlocking a series of loops of yarns or filaments. There are two basic knitting methods:

a) *Warp knitting* — A method of knitting in which the yarns or filaments run in the machine direction.

b) *Weft knitting* — A method of knitting in which one yarn or filament is interlooped with the previous course of loops made by the yarn. Circular knitting is a common method of weft knitting.

2.1.19 *Knitted Fabric* — A fabric made by interlocking yarns or filaments in a series of connected loops.

2.1.20 *Laminate Non-woven* — A laminate of two or more layers of material in which the essential component is a non-woven material.

2.1.21 *Leno Bag* — A bag made from leno fabric (for example PP, HDPE, etc) generally used for packaging and storage of fruits and vegetables and other perishable commodities.

2.1.22 *Leno Fabric* — A fabric in which warp threads are made to cross one another, between the picks, during leno weaving. The crossing of the warp threads may be a general feature of plain leno fabrics (as in marquisette and some gauzes and muslins) or may be used in combination with other weave (as in some cellular fabrics). Leno weave is also called as gauze or doup weave.

2.1.23 *Low Tunnel Greenhouse* — A miniature greenhouse.

2.1.24 *Meltblown Fabric* — Non-woven fabric made by the conversion of molten polymer into a web. The molten plastic is blown with hot, high-velocity air through extruder die lips. The filaments exiting from the extruder are attenuated during their formation until they break. The fibres break into short lengths rather than being continuous, as those formed from the spinneret used in spun bonding. The short fibres, thereby created, are spread with cool quench air onto a moving belt called a forming fabric, or onto a drum, where they bond to each other on cooling to form a white, opaque, fine-fibred web.

2.1.25 *Meltblowing* — The formation of a non-woven by extruding molten polymer through a die then attenuating and breaking the resulting filaments with hot, high-velocity air or steam. This results in short fibre lengths. The short fibres are then collected on a moving screen where they bond during cooling.

2.1.26 *Needle Punching* — Mechanically binding a web to form a fabric by penetrating the web with an array of barbed needles that carry tufts of the web's own fibres in a vertical direction through the web.

2.1.27 *Nonwoven Fabric* — A fabric made directly from a web of fibre, without the yarn preparation necessary for weaving and knitting.

NOTES

1 In a non-woven, the assembly of textile fibres is held together, a) by mechanical interlocking in a random web or mat; b) by fusing of the fibres, as in the case of thermoplastic fibres; or c) by bonding with a cementing medium such as starch, casein, rubber latex, a cellulose derivative or synthetic resin. Initially, the fibres may be oriented in one direction or may be deposited in a random manner. This web or sheet is then bonded together by one of the methods described above.

2 Fibre lengths can range from 6 mm to 150 mm for crimped fibres up to continuous filament in spunbonded fabrics.

3 The major technologies used to manufacture nonwoven fabric materials are hydroentangling or needling, carded thermal bonding, spunbonding and meltblowing.

2.1.28 *Polyhouse* — A structure covered with polyethylene film is a polyhouse.

2.1.29 *Sealing Sheets* — These urethane blend flexible membranes prevent leakage from under the tank and avoid costly and/or contaminated fluids from escaping into the soil.

NOTE — Tanks for fluid products, whether it be water or liquid manure, usually have a bottom and resistant side walls composed of juxtaposed prefabricated panels. To better contain fluids and effluents, some of these are lined with special sealing sheets, or tank liners. Sealing sheets have proven to be a successful and economical method of solving a large variety of liquid containment problems. They are adaptable to nearly all shapes, sizes and types of tanks, and are resistant to a wide range of chemicals, industrial effluents and other liquids.

2.1.30 *Shade-net House* — A framed structure made up of either GI pipe, or MS angle, or wood or bamboo or GI wire or RCC pole and covered with UV stabilized polyethylene monofilaments in woven and knitted form and is used in saving food grains, plants from sun, UV rays. Shade nets have different shading area percentages depending upon the type of plant grown to permit controlled sunlight sufficient for growth of plant by creating partially controlled climatic conditions of light intensity and heat during the day time to provide plants a comfortable stress free growth.

2.1.31 *Spunbond, Spunbonded* — Spunbond fabrics are produced by depositing extruded, spun filaments onto a collecting belt in a uniform random manner followed by bonding the fibres.

NOTES

1 The fibres are separated during the web laying process by air jets or electrostatic charges. The collecting surface is usually perforated to prevent the air stream from deflecting and carrying the fibres in an uncontrolled manner. Bonding imparts strength and integrity to the web by applying heated rolls or hot needles to partially melt the polymer and fuse the fibres together.

2 Since molecular orientation increases the melting point, fibres that are not highly drawn can be used as thermal binding fibres. Polyethylene or random ethylene-propylene copolymers are used as low melting bonding sites. Spunbond products are employed in carpet backing, geotextiles, and disposable medical/hygiene products. Since the fabric production is combined with fibre production, the process is generally more economical than when using staple fibre to make non-woven fabrics.

2.1.32 *Spunbond Non-woven, Spunbonded Non-woven* — A fabric formed from spunbonded process that has been bonded by one or more methods to provide fabric integrity.

2.1.33 *Spunbond/Melt Blown Composite* — A multiple layer fabric that is generally made of various alternating layers of spunbond and melt blown webs: SMS, SMMS, SSMMS, etc.

2.1.34 *Spunlace Bonding, Spunlaced Bonding* — The method of bonding a web by interlocking and entangling the fibres about each other with high velocity streams of water (synonymous with hydroentangling).

NOTE — Spunlacing, not to be confused with spunlaid, is generally produced from a web made up of staple fibres from a dry formed, carded system, but small quantities of spunlace bonding are done on production lines that use a wet laid forming process. A recent technical development is the production of a spunlaced non-woven from a spunlaid, continuous filament web.

2.1.35 *Spunlace Non-woven, Spunlaced Non-woven* — A fabric produced by the spunlace technology.

NOTE — Spunlace is synonymous with hydroentangling.

2.1.36 *Stitch Bond Non-woven* — A non-woven produced by the stitch bonding process.

2.1.37 *Tarpaulins* — A tarpaulin, or tarp, is a large sheet of strong, flexible, water-resistant or waterproof material, usually coated with plastic or latex. Tarps have multiple uses, including shelter from the elements (that is wind, rain, or sunlight), use as a ground sheet for equipment, or covering for protecting vehicles or wood piles. They are also used on outdoor market stalls to provide some protection from the weather. Tarps often have reinforced grommets at the corners and along the sides to form attachment points for rope.

2.1.38 *Thermal Bonded/Thermobonded* — A web of fibres bonded by a thermal bonding (thermobonding) process.

2.1.39 *Thermal Bonding/Thermobonding* — A technique for bonding a web of fibres in which a heat or ultrasonic treatment, with or without pressure, is used to activate a heat-sensitive material. The material may be in the form of homofil fibres, bicomponent fibres, fusable powders, as part of the web. The bonding may be applied all over (for example through or area bonding) or restricted to predetermined, discrete sites (for example point bonding).

2.1.40 *Trellising Twine* — It is a twisted multifilament or fabricated tape twines for gently holding up the plants without the need of additional stake.

NOTE — The twines wound on pulley with hanging and stopping bracket allows changing the effective length of twine as the plant grows.

2.1.42 *Wet Laying or Wet Forming* — Wet laid non-wovens are produced in a process similar to paper making. The non-woven web is produced by filtering an aqueous suspension of fibre onto a screen conveyor belt or perforated drum. Many wet laid non-wovens are made with wood pulp or other natural fibres blended with synthetic fibres or fibreglass

2.1.43 *Wet Laid Non-woven* — A wet laid web bonded by one or more techniques to provide fabric integrity.

2.1.44 *Woven Fabric* — It is generally used to refer to fabric composed of two sets of yarns, warp and filling, that is formed by interlacing of these sets of yarns. However, there are woven fabrics in which three sets of yarn are used to give a tri-axial weave. In two-dimensional woven fabrics, there may be two or more warps and fillings in a fabric, depending on the complexity of the construction.

NOTE — The manner in which the two sets of yarns are interlaced determines the weave. By using various combinations of the three basic weaves, plain, twill, and satin, it is possible to produce an almost unlimited variety of constructions. Other effects may be obtained by varying the type of yarns, filament or spun, and the fibre types, twist levels, etc.

2.2 Textile Terms Used in Fishing

2.2.1 *Anchor Seine* — An encircling net shot in the open sea using very long ropes to lay out the net and ropes on the seabed prior to hauling from a boat at anchor.

2.2.2 *Aquaculture Liners* — Usually made of reinforced polypropylene used in tanks or ponds, which house fish in order to provide a controlled environment, with clear water that can be treated to minimize disease and nuisance weeds.

NOTE — The material of liners must not emit any harmful chemicals. It must have excellent puncture and tear resistance, especially for farming applications where it will have to hold up to harvesting and cleaning, or where the liner is installed over a rocky surface. The liner must be fabricated and installed so that it is watertight-preventing seepage can be a major cost savings.

2.2.3 *Beach Seine* — An encircling net shot from a small boat then drawn ashore by ropes. This is sometimes called a dragnet.

2.2.4 *Beam Trawl* — A trawl towed on the seabed in which the net is held open by a wood or steel beam.

2.2.5 *Braided Fishing Line* — It is one of the of earliest types of fishing line, made from natural and synthetic fibres is known for its high knot strength, lack of stretch, and great overall power in relation to its diameter. Braided fishing lines tend to have good resistance to abrasion. Their actual breaking strength will commonly well exceed their pound-test rating.

2.2.6 *Cast or Throw Net* — A small round net with weights on the edges which is thrown by the fisher. Sizes vary up to about 4 m in diameter. The net is thrown by hand in such a manner that it spreads out on the water and sinks. Its use on the high seas is prohibited, but still occurs.

2.2.7 *Demersal Gear* — A collective term for fishing gear that is used on the seabed.

2.2.8 *Dragnet* — This is a general term which can be applied to any net which is dragged or hauled across a river or along the bottom of a lake or sea. The fishing depth of this net can be adjusted by adding weights to the bottom.

2.2.9 *Dredge* — A rigid structure towed on the seabed usually for shellfish.

2.2.10 *Drift Net* — Panel of gill nets set perpendicular to the surface, allowed to drift with the tide or current to catch fish. The drift net is a net that is not anchored, but is drifting with the current. It is usually a gill or tangle net, and hang vertically in the water column without being anchored to the bottom. The nets are keep vertical in the water by floats attached to a rope along the top of the net and weights attached to another rope along the bottom of the net. Drift nets generally rely on the entanglement properties of loosely affixed netting. Folds of loose netting, much like a window drapery, snag on a fish's tail and fins and wrap the fish up in loose netting as it struggles to escape. However, the nets can also function as gill nets, if fish are captured when their gills get stuck in the net. The size of the mesh varies depending on the fish being targeted.

2.2.11 *Drive-in Net* — A drive-in net is another fixed net, dustpan-shaped, resembling a trawl net with long wings. The front part of the net is laid along the seabed.

2.2.12 *Entangling Nets* — Nets with large meshes set on the seabed to capture shellfish and large whitefish such as monk, ray and turbot (also known as ray nets).

2.2.13 *Fishing Lines* — Ropes and lines made of fibre lengths, twisted or braided together to provide tensile strength. They are used for pulling, but not for pushing. The availability of reliable and durable ropes and lines has had many consequences for the development and utility of fishing nets, and influences particularly the scale at which the nets can be deployed.

2.2.14 *Fishing Net* — A net used for fishing and consists of usually meshes formed by knotting a relatively thin thread. Modern nets are usually made from monofilament or multifilament of nylon, polyester or HDPE although nets of organic polyamides such as wool or silk thread are also used.

2.2.15 *Fixed Nets* — Panel of gill nets anchored perpendicular in the water to catch fish.

2.2.16 *Fyke Net* — Is a conical shaped trap net with a circular or D shaped opening often with a guide panel/s of netting often used to catch eels. Fyke nets are bag-shaped nets which are held open by hoops. These can be linked together in long chains, and are used to catch eels in rivers. If fyke nets are equipped with wings and leaders, they can also be used in sheltered places in lakes where there is plenty of plant life. Hundreds of these nets can be connected into systems where it is not practical to build large traps.

2.2.17 *Gill Nets* — Single wall of netting which can either be fixed or allowed to drift. They catch fish by enmeshing or entangling them usually around their gill covers.

2.2.18 *Handlines* — Fishing with a single fishing line by hand. Handlines is also a term used for 'gurdy' fishing for mackerel (a large hand operated reel).

2.2.19 *Heavy Otter Trawl* — Any otter trawl that uses any of the following:

a) Sheet netting of greater than 4 mm twine thickness,
b) Rockhoppers or discs of 200 mm or above diameter, and
c) A chain for the foot/ground line (instead of wire).

2.2.20 *Industrial Trawl* — Small mesh towed net used to catch fish (such as sandeels, blue whiting or horse mackerel) for purposes other than human consumption.

2.2.21 *Jigging* — It is a type of fishing with a rod or machine and is a type of fishing lure. A sinker with hooks on a single or multiple lines is jerked to attract many species of fish in both fresh and saltwater. Trolling is a method of towing artificial lures to attract fish.

2.2.22 *Light Otter Trawl* — Any otter trawl that uses anything less than the definition of a heavy otter trawl.

2.2.23 *Longlines* — Longlines that can be anchored or drifting, comprising backing lines, of variable lengths, to which are attached a series of baited hooks on snoods.

2.2.24 *Mid-water Trawl* — Trawl towed by one vessel using a set of otter boards (trawl doors) designed for the midwater to open the net horizontally. The position within the water column is controlled by the speed of the vessel and the amount of weight on the wing ends.

2.2.25 *Mid-water Trawl (Pair)* — As above but towed by two vessels.

2.2.26 *Monofilament Fishing Line* — It is fishing line made from a single fibre of plastic. Most fishing lines are now monofilament because monofilament fibres are cheap to produce and are produced in a range of diameters which have different tensile strengths. Monofilament line is also manufactured in different colours, such as clear, white, green, blue, red, and fluorescent.

Monofilament is made by melting and mixing polymers and then extruding the mixture through tiny holes, forming strands of line, which is then spun into spools of various thicknesses. The extrusion process controls not only the thickness of the line but its test as well.

2.2.27 *Multifilament Fishing Line* — Multifilament Line (also referred to as The Super Lines) is a type of fishing line. It is a braided line which is made up of a type of polyethylene, an extremely thin line for its strength. By weight, polyethylene strands are five to ten times sturdier than steel. Multifilament line is almost similar to braided dacron in terms of sensitivity but a diameter about one-third that of monofilament.

Multifilament works best on conventional and baitcasting reels. On spinning and spincasting reels, the line's limpness can make sure for awkward manipulation, as it doesn't spring off the reel like monofilament. Consequently, knot-tying is more difficult with multifilaments. Certain knots work better with superline, like the palomar knot. Applying a type of super glue will help to prevent other types of knots from slipping.

This type of fishing line is expensive, sometimes four times the cost of equivalent monofilament. This can become a considerable expense, especially considering that the line is so thin that you need more of it to fill a reel spool. Sometimes, a backing of monofilament or other line is used under the braided line on the spool.

2.2.28 *Multi-rig Trawl/Outrig Trawl* — The method of towing two or more otter trawls side by side.

2.2.29 *Otter Trawl* — A trawl towed on the seabed, held open by a pair of otter boards (trawl doors). Typically allows greater ground cover than a beam trawl. There are a wide variety of otter trawl varieties depending upon the nature of the ground to be fished and the target species. This includes light and heavy otter trawl designs. Heavy otter trawls include rock-hopper ground rope designs.

2.2.30 *Pair Seine* — A trawl towed between two boats but longer lengths (as much as 3 500 m) of seine net ropes and combination wire. Used to fish large areas of clean ground and can cover a swept area of 300 to 750 metres.

2.2.31 *Pair Trawl* — A trawl towed between two boats, either on the seabed or in mid-water, held open by the distance apart of the two vessels. Covers small areas of hard seabed and can cover a swept area of 250 to 450 metres between boats with/without otter boards (trawl doors).

2.2.32 *Pelagic Fishing* — Fishing for targeted fish in the water column rather than on the sea floor.

2.2.33 *Pulse Beam Trawl* — An innovative new whitefish beam trawl method using electric current.

2.2.34 *Pump Scoop Dredging* — A small shallow drafted boats tow or drag metal baskets along the seabed to collect cockles and clams.

2.2.35 *Purse Seine* — A large net used to surround a shoal of pelagic fish, the bottom of which is then drawn together to enclose them.

2.2.36 *Ring Net* — Net operated by surrounding a shoal of pelagic fish with a wall of netting, often operated by two boats. Works in a similar manner as a purse seine.

2.2.37 *Scottish/Fly Seine* — An encircling net shot in the open sea using very long ropes to lay out the net and ropes on the seabed prior to towing the net closed and hauling from a boat under its own power. Sometimes called fly dragging, fly shooting or Danish seine.

2.2.38 *Semi Pelagic Trawling* — Towing a trawl close to the seabed but not in contact with it.

2.2.39 *Shrimp Push-Nets* — A triangular shape hand net with wooden or metal frame used to collect shrimp. A handle is attached to the frame and pushed along the surface of sand in order to collect the shrimp.

2.2.40 *Stake Nets* — Is a net fixed by stakes generally in rivers or where the sea ebbs and flows in shallow intertidal zones.

2.2.41 *Static/Passive Gear* — A collective term for gear set to allow fish to swim into it, or they are attracted to it by bait and consequently become caught by the gear, specifically nets, longlines and traps.

2.2.42 *Suction Dredging* — The use of hydraulic dredger to collect cockles.

2.2.43 *Seine Net* — A seine is a large fishing net that may be arranged in a number of different ways. In purse seine fishing the net hangs vertically in the water by attaching weights along the bottom edge and floats along the top. A simple and commonly used fishing technique is beach seining, where the seine net is operated from the shore.

2.2.44 *Shore Operated Stationary Lift Nets* — These are held horizontally by a large fixed structure and periodically lowered into the water. Huge mechanical contrivances hold out horizontal nets with diameters of twenty metres or more. The nets are dipped into the water and raised again, but otherwise cannot be moved. The nets may hold bait or be fitted with lights to attract more fish. The most famous examples are found at Kochi, India, where they are known as Chinese fishing nets (*Cheena vala*).

2.2.45 *Shrimp Net* — A dredge net fixed upon a pole, or a sweep net dragged over the fishing ground.

2.2.46 *Stake Net* — A stake net is a form of net for catching fish in shallow inter-tidal zones. It consists of a sheet of network stretched on stakes fixed into the ground, generally in rivers or where the sea ebbs and flows, and is used for catching the fish.

2.2.47 *Surrounding Net* — A surrounding net surrounds fish on all sides. It is an evolution of the seine, and is typically used by commercial fishers.

2.2.48 *Tangle Net* — It is also known as tooth nets, are similar to gillnets, except that they have a smaller mesh size designed to catch the fish by the teeth or upper jaw bone instead of by the gills.

2.2.49 *Trammel* — A trammel is a fishing net with three layers of netting that is used to entangle fish or crustacea A slack central layer with a small mesh is sandwiched between two taut outer layers with a much larger mesh. The net is kept vertical by the floats on the head rope and weights on the bottom rope.

2.2.50 *Trawl Net* — A large net, conical in shape, designed to be towed along the sea bottom. The trawl is pulled through the water by one or more boats, called trawlers or draggers. The activity of pulling the trawl through the water is called trawling or dragging.

2.2.51 *Twine* — A light string or strong thread composed of two or more smaller strands or yarns twisted together. More generally, the term can be applied to a cord. Natural fibres used for making twine include cotton, sisal, jute, hemp, henequen, and coir. A variety of synthetic fibres may also be used.

2.2.52 *Towed Gear* — The gear is towed through the water, either on or off the seabed, to overrun the target species or herd them into the net.

2.2.53 *Trammel Nets* — It consists of three parallel panels of nets with different mesh sizes which can be used to catch a much wider variety of species.

2.2.54 *Traps* — A collective term for structures into which fish or shellfish are guided or enticed through funnels that encourage entry but limit escape. Pots, creels, fish traps.

2.2.55 *Wing Beam Trawl* — Uses sumwing and tickler chains to fish for whitefish.

2.3 Textile Terms Used for Plant Protection Nets

2.3.1 *Bird Protection Nets* — UV stabilized nets made from polyester or light weight polypropylene monofilaments, polyethylene tape yarns and sometimes knitted nylon nets, used to protect crops against damage caused by aerial bird raids and attacks from larger ground animals such as pigeons, butterflies and other similar birds.

NOTE — The netting apertures allow smaller essential pollinating insects through.

2.3.2 *Braided Netting Twine* — The product of braiding or plaiting netting yarns and/or netting twines.

2.3.3 *Cabled Netting Twine* — The product of further twisting operations embracing two or more netting twines.

2.3.4 *Cherry Covers* — They are polypropylene nets used for protection of cherry crop throughout the season from frost, rain, hail and wind.

2.3.5 *Circular Bale and Pallet Nets* — Lightweight polyethylene nets used for securing circular hay bales and for stabilising pallets and piles of boxes so that they can be transported safely.

2.3.6 *Deer Fencing Netting* — A very high strength, lightweight 1.8 m high fence netting manufactured from UV stabilised and rot proof polypropylene.

NOTE — The deer netting shall be installed by battening to the fencing posts to ensure the mesh filaments are not damaged.

2.3.7 *Hails Protection Nets* — UV stabilised polyethylene monofilament nets in woven/knitted form used to cover plants and fruit orchards usually of small mesh size to protect them from being damaged by hailstones, but does not restrict their growth.

2.3.8 *Harvesting Nets* — Nets usually made from polyethylene or polyester monofilaments or polyethylene tape yarns used for collecting fruits which fall off the tree when they are ripe, or which have to be shaken off the tree.

NOTE — The nets are placed underneath the trees until the harvesting period is over. This simplifies and rationalises the harvesting process considerably. The size of openings in the net can be varied, depending on the size of the fruit. The holes are produced by varying the pillar stitch/inlay lapping.

2.3.9 *Insect Protection Nets* — A light hand net made of fine woven screens generally made of synthetics fibres such as nylon, polyester, etc, used to protect plants from pests attack or for catching insects

2.3.10 *Insect Mesh /Fine Screening Netting* — It is a high quality extruded HDPE plastic fine screening mesh, with a fine mesh structure offering effective protection from the smallest of insects and debris. The mesh provides excellent light transmission and allows good air-flow. The fine screening mesh is rigid, so that it can be installed in panels and used as insect netting in both temporary and permanent applications.

NOTE — Insect mesh can be used as a fencing or as part of an industrial application to keep insects and mosquitos out (cladding, eaves, double glazing windows and conservatory construction).

2.3.11 *Knotless Netting* — Netting constructed by joining together the filaments in the twines to form meshes without external knots.

2.3.12 *Mesh* — A design formed opening, surrounded by netting material. There are several types of mesh shapes.

2.3.12.1 *Diamond mesh* — A mesh composed of four sides of the same length.

2.3.12.2 *Square mesh* — A diamond mesh in which adjacent sides are at right angles.

2.3.12.3 *Hexagonal mesh* — A mesh composed of six sides, out of which the length of one pair of opposite sides can be different from that of the other four sides, in case of an irregular hexagon.

2.3.13 *Net* — An open fabric made by knotting the intersections of thread, cord, or wires to form meshes so as to stretch in one or both directions.

NOTE — Net can be made by hand or machine in a variety of mesh sizes and weights matched to varying end uses, that is veils, curtains, fish nets, and heavy cargo nets.

2.3.14 *Netting* — A meshed structure of indefinite shape and size composed of one yarn or of one or more systems of yarns interlaced or joined, or obtained by other means, for example by stamping or cutting from sheet material or by extrusion

2.3.15 *Netting Twine* — The product of one twisting operation embracing two or more single yarns or monofilaments.

2.3.16 *Netting Yarn* — All types of yarns suitable for the manufacture of netting.

NOTES

1 The principal types of netting yarns are twines. The latter are defined below. The size of netting yarn is indicated by its linear density expressed in the unit tex of the Tex system. The size of the final product is expressed by the resultant linear density.

2 The resultant linear density is the reciprocal of runnage which expresses the length per unit mass, in metres per gram or per kilogram.

2.3.17 *Percentage Open Area* — The percentage of light that passes through the fabric i.e. the ratio of the open area in the fabric to the total fabric area expressed as a percentage.

2.3.18 *Percentage Shading Area* — 100 minus percentage open area. For example, a 40 percent shade net is equivalent to having 60 percent of the light passing through it.

2.3.19 *Plant Net* — A vertical or tiered net made from polyethylene or polypropylene monofilaments to keep the fruits, which grow close to the ground, away from the damp soil by allowing them to grow through vertical or tiered nets in order to keep the amount of decayed fruit to a minimum.

2.3.20 *Plant Support Netting / Pea and Bean Net* — A high strength, yet lightweight polypropylene mesh netting designed to support all climbing plants, vegetables and long-stemmed ornamental flowers encouraging healthy growth from seedling to maturity.

NOTE — Plant support nets can be used vertically to support and encourage the growth of climbing vegetable crops including garden peas, runner beans, cucumbers, marrows, courgettes, tomatoes, sweet peas and clematis by providing the crops with lateral support. The netting is usually stretched or draped over a support frame, bamboo canes or against a wall. The plastic mesh netting is UV stabilised and rot resistant

2.3.21 *Root Ball Net* — Nets generally made of synthetic fibres used for protection of young plants so that root system is not damaged when they are dug up, transplanted or replanted.

2.3.22 *Shade-house* — A green-house style structure, covered in porous shade-cloth for the sole purpose of provided shade for the contents.

2.3.23 *Shade Nets* — It is generally made of UV stabilized PP or HDPE in knitted and woven form used for growth of plants in horticulture, floriculture and sericulture.

2.3.24 *Shelter Shade Fence/Garden Fencing Mesh* — A heavy duty UV stabilised polyethylene barrier fencing mesh for many applications in horticulture and gardening such as garden fence, or keeping pets like dogs confined or as windbreak fencing. It can be used as a snow fence and sand fencing in extreme conditions.

2.3.25 *Sun Protection Nets* — Warp-knitted nets made from UV resistant synthetic fibres used in hot countries for protecting plants and people from harmful UV rays and heat by placing over play areas, car parks, patios and terraces.

NOTE — The low weight of nets makes it easy for them to be erected easily over banks of seats and play areas and they can be even disassembled with ease. They are a cheap and flexible alternative to traditional, static sun-screens.

2.3.26 *Throwover Net* — Net or shade cloth placed over an item or plant for a short-term only; usually there is very little supporting structure other than the item or plant itself. Intended to be easily removed after it has served its purpose.

2.3.27 *Windbreak Fencing Mesh/Windbreak Cladding* — A UV stabilised and rot resistant high strength extruded HDPE fencing mesh designed to offer essential protection for crops, nurseries, house farmed animals and gardens from destructive winds, driving rain and drifting snow.

NOTE — The Windbreak mesh should be erected by battening to wooden fence posts, or by battening to existing chain link fencing around sports grounds. Battening ensures that the forces exerted onto the wind break mesh filaments are spread evenly ensuring that the mesh will not tear. The windbreak mesh will offer maintenance free protection.

2.3.28 *Wind Protection Nets/Wind-Breaks* — Nets generally made of monofilaments (PP or polyester) or polyethylene tape yarns, used to protect fields of young plants, trees or the harvest from being damaged by the wind.

NOTE — Erecting wind-breaks at right angles protects the young seedlings and the mature plants from dying out and being broken. The nets used here reduce the effects of high winds and even help to keep out airborne sand and salt in areas close to the sea. Protecting plants from high winds also encourages plant growth and reduces the number of irrigation cycles required.

2.4 Textile Terms Used for Ground Covers

2.4.1 *Composite Turf Reinforcement Mat (C-TRM)* — A rolled erosion control product composed of non-degradable synthetic fibres, filaments, nets, wire mesh and/or other elements, processed into a permanent, three-dimensional matrix of sufficient thickness. Composite Turf Reinforcement Mats (C-TRM), which may be supplemented with degradable components, are designed to impart immediate erosion protection, enhance vegetation establishment and provide long-term functionality by permanently reinforcing vegetation during and after maturation.

NOTE — C-TRMs are typically used in hydraulic applications, such as high flow ditches and channels, steep slopes, stream banks and shorelines, where erosive forces may exceed the limits of natural, un-reinforced vegetation or in areas where limited vegetation establishment is anticipated.

2.4.2 *Erosion Control Blanket (ECB)* — A temporary degradable rolled erosion control product composed of processed natural or polymer fibres mechanically, structurally or chemically bound together to form a continuous matrix to provide erosion control and facilitate vegetation establishment by reducing seed and soil loss.

NOTE — Organic erosion control blankets range from lightweight straw blankets to heavier, slower degrading coconut blankets. Each blanket stitched together using biodegradable thread and held together using photodegradable plastic netting. For longer-term protection, turf reinforcement mats, made from polypropylene are used.

2.4.3 *Floating Row Cover* — A fibre sheet that is placed over a row or bed of plants for protection from heat, cold, or insects.

2.4.4 *Flower and Vegetable Support Mesh* — A high strength polypropylene flower and vegetable support mesh provides crop row stability and assists in preventing stem and bloom damage. Plastic netting can offer less stem abrasion than traditional wire netting and is cost-effective and easily disposed of. Distinctive mesh colour is essential to make the netting highly visible amongst dense crop foliage for improved handling and reduced accidental cuts.

2.4.5 *Grass Protection Matting* — A reusable heavy duty HDPE reinforcement mesh bonded to a strong needle punched nonwoven fabric used to provide two functions for the temporary protection and access requirements on grass surfaces depending whether the mesh or fabric is laid upwards.

NOTE — It is particularly necessary in wet and muddy conditions. It protects the grass surface and allows pedestrian and vehicle access on wet and muddy grass.

2.4.6 *Grass Reinforcement Matting* — A flexible polypropylene mesh designed for applications around children play areas, playgrounds and for equestrian surfaces where a softer mesh is required in case of a fall.

NOTE — When used on grass, the mesh allows the grass sward to grow through the mesh apertures, producing a reinforced natural looking grass surface with the benefit of a critical fall height cushioning. This mesh structure design increases slip resistance and the soft flexible elastomeric polymer blend behaves similar to rubber matting further increasing slip resistance

2.4.7 *Grass Reinforcement Protection Mesh* — A heavy duty thick polyethylene grid for reinforcing and protecting grassed surfaces prone to wear, rutting and smearing which can result in a muddy surface incapable of withstanding vehicular or pedestrian applications.

2.4.8 *Greenhouse Light Reflective Flooring* — This bright white flooring cover manufactured from a heavy-duty commercial grade of UV stabilized polypropylene provides excellent available light reflectivity from the floor back into dense crop foliage. Greenhouse flooring will resist heavy foot traffic and wear from greenhouse trolleys and is usually highly breathable in order to limit the likelihood of the covered soil going sour.

2.4.9 *Ground Cover Fabric* — It refers to any plant material low to the ground, made from PP/Polyester that can be used to cover areas where grass will not grow or is not desired. Ground cover fabrics are made up of natural or synthetic materials that are either woven or non woven products, spun bonded or needle punched used to suppress weed growth around the crop by covering the soil, blocking extreme climatic conditions of sunlight or cold.

2.4.10 *Insulation Nets* — They are near transparent knitted nets used in protecting crops from heavy rain, pests and frosts. Their permeable construction allows air and moisture to travel through them at a reduced and controlled rate. Insulation nets are often used as a horizontal curtain within a structure to create an overhead thermal barrier. They usually provide minimal shading to the crop for improved crop performance in duller and cooler winter/spring months.

2.4.11 *Landscape Fabric* — A loosely woven or spun bonded non-woven synthetic fabric placed over the soil, but under the mulch. It allows the movement of air, water, and fertilizers into the soil. It provides a barrier for weeds to germinate. This is then dressed with mulch of any kind.

NOTES

1 Fabric may be woven or spun bonded, and shall be a product specifically designed for weed control. Geotextiles with a high percentage of closed space have been found to be most effective.

2 Black plastic is not a suitable substitute for landscape fabric as it does not permit air and water to pass to the growing medium.

2.4.12 *Mat* — A covering of straw or fabric, for hotbeds and coldframes, to protect the plants against injurious cold.

2.4.13 *Mulch* — It is an aesthetic ground cover applied to planted areas at the time of planting to suppress weed growth. It covers the soil, blocks light and prevents the competitive weed growth around seed links. Mulch is not intended to replace vegetation as an exclusive ground cover, nor is it to be utilized as a growing medium in the landscape.

2.4.14 *Mulch Control Netting (MCN)* — A planar woven natural fibre or extruded fabric mesh used as a temporary degradable rolled erosion control product to anchor loose fibre mulches.

2.4.15 *Mulch Mats* — A mat used to cover soil around a plant root zone with a view to modify soil environment favorably to conserve soil moisture, moderate soil temperature and suppress weed growth in horticultural crop production.

NOTE — Materials such as plant leaves, hay, paddy straw, paddy husk, jowar trash, saw dust, dry grass, dry sugarcane leaves, dry coconut leaves, coconut hush, paper, crop residue or the like including synthetic fibre, plastic films, nets or jute fibre can be used as mulch mat.

2.4.16 *Plastic Mulch Mat* — It is generally made from polyethylene monolayer/multilayer films of various thicknesses.

2.4.17 *Permanent Rolled Erosion Control Products* — Products used for applications where natural vegetation alone will not sustain expected flow conditions and/or provide sufficient long-term erosion protection, furnish a permanent rolled erosion control product with the necessary performance properties to effectively control erosion and reinforce vegetation under the expected long-term site conditions.

2.4.18 *Rolled Erosion Control Products (RECP)* — A temporary degradable or long-term non degradable material manufactured or fabricated into rolls designed to reduce soil erosion and assist in the growth, establishment and protection of vegetation.

2.4.19 *Sunscreen* — UV stabilised warp-knitted nets used to protect fields and greenhouses from the intense solar radiation for healthy plant growth and good harvest. Sunscreen nets with open mesh construction are used to control sunshine and amount of shade required. These net fabrics allow the air to flow freely. So the excess heat does not build up under the screen.

The percentage of shadow varies according to the density of threads.

2.4.20 *Turf Protection Net* — A protective soil cover of straw, wood, coconut fibre or other suitable plant residue, or plastic fibres formed into a mat, usually with a plastic or biodegradable mesh on one or both sides. Erosion mats are rolled products available in many varieties and combination of materials and with varying life spans.

2.4.21 *Turf Reinforcement Mesh* — An extruded HDPE mesh for the protection and reinforcement of grass and turf. The turf reinforcement mesh stabilises the grass and enables the grass to intertwine with the plastic mesh filaments creating a strong stable reinforced grassed surface. The grass protection mesh is ideal for pedestrian and light vehicle use, overflow car parks, and airport taxi-ways.

2.4.22 *Turf Reinforcement Mat (TRM)* — A rolled erosion control product composed of non-degradable synthetic fibres/filaments (polyester or polypropylene), nets, wire mesh and/or other elements, processed into a permanent, three-dimensional matrix of sufficient thickness to greatly reinforce the root system of the desired vegetation for permanent erosion protection in high flow channels and on critical slopes. TRMs, which may be supplemented with degradable components, are designed to impart immediate erosion protection, enhance vegetation establishment and provide long-term functionality by permanently reinforcing vegetation during and after maturation.

NOTE — TRMs are typically used in hydraulic applications, such as high flow ditches and channels, steep slopes, stream banks, and shorelines, where erosive forces may exceed the limits of natural, unreinforced vegetation or in areas where limited vegetation establishment is anticipated.

2.4.23 *Temporary Rolled Erosion Control Products* — Products used for applications where natural vegetation alone will provide sufficient permanent erosion protection, furnish a temporary rolled erosion control product with the necessary longevity and performance properties to effectively control erosion and assist in the establishment of vegetation under the anticipated immediate site conditions.

2.5 Textile Terms Used for Animal Husbandry

2.5.1 *Identification Belts* — It is made of nylon and polyester used for cows identification.

2.5.2 *Livestock Ground Fabric* — A high-strength, long-lasting ground fabric used to keep cattle and other agricultural animals off wet and soft soil patches. Livestock fabrics are used for aggregate roads and paths and under feed lots, as well as for the protection of livestock in stalls or holding areas in farming operations.

2.5.3 *Milk Filters* — Non-woven fabrics are used to filter the milk in automatic milking systems.

2.5.4 *Poultry Curtains* — Curtains made from polyester fibres/filament used to protect precious flocks of farm fowl, which offer light control, thermal protection and ventilation control, even at sub-freezing temperatures.

2.5.5 *Tether* — A rope, chain, or similar restraint for holding an animal in place, allowing a short radius in which it can move about.

2.5.6 *Udder Nets* — Textile nets are used to support the large baglike organ containing the mammary glands, characteristic of certain female mammals, such as cows, sheep, and goats, etc, known as udders.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Technical Textiles for Agro-tech Sectional Committee, TXD 35

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